DOCUMENT RESUME

ED 058 000 RE 003 940

AUTHOR	Peterson, Joe; And Others
TITLE	Validation of the Cloze Procedure as a Measure of Readability with High School, Trade School, and College Populations.
PUB DATE	2 Dec 71
NOTE	14p.; Paper presented at the National Reading Conference, Tampa, Fla., Dec. 1971
AVAILABLE FROM	National Reading Conference, Inc., Marquette University, 1217 W. Wisconsin Ave., Milwaukee, Wis. 53233
EDRS PRICE	MF-$0.65 HC Not Available from EDRS.
DESCRIPTORS	*Adult Students; *Cloze Procedure; Conference Reports; *Grade Equivalent Scales; *High School Students; Instructional Materials; *Readability; Reading Comprehension

ABSTRACT

This study sought to determine whether the cloze percentage score which Bormuth identified as corresponding to the instructional level for intermediate grade pupils is applicable to more sophisticated students. Reading grade equivalent scores were obtained for 92 eleventh graders and 84 post-high school students on a standardized reading comprehension test. Then cloze passages on health education were assigned to subjects on the basis of a match between grade equivalent scores of the reading test and prediction of readability on the passages. Obtained mean cloze scores for the high school students were considerably higher than those for the post-high school students. A sampling of the cumulative records, available only on the high school students, for previous reading scores on other standardized tests yielded scores higher than those obtained in this study. It was hypothesized that the cloze material might have been at a difficulty level below these students' actual reading level. Since no major discrepancies were observed with the adult groups, the author concluded that it seems possible to use Bormuth's criteria for determining the instructional level with adults. Tables and references are included. (AW)

ED 058000

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Joe Peterson, Nat Peters, and Ed Paradis

Paper Presented at the Twenty-first Annual Meeting of

The National Reading Conference, Tampa, Florida

December 2, 1971

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Validation of the Cloze Procedure as a Measure of Readability with High School, Trade School, and College Populations

Joe Peterson, Nat Peters, and Ed Paradis*

A number of studies have been designed to explore the relationship between the reader's ability to obtain closure on a mutilated passage and the more traditional determinants of readability. Rather well documented evidence (2,6) has been accumulated which demonstrates that the cloze technique does measure readability and can be used for ranking a given number of passages according to relative difficulty. Recently, a few studies have yielded standards which might be used to determine whether or not a given passage is of appropriate difficulty for individual readers.

These studies, by and large, are dependent upon the standards for comprehension which Betts (1) has determined to be appropriate for

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*Drs. Peterson and Paradis are assistant professors at the University of Georgia. Dr. Peters is associate director of the Language and Reading Center at Oakland Schools, Pontiac, Michigan.

the instructional and independent reading levels, respectively 75 and 90% correct responses to questions based upon the selection.

Bormuth (3,4) has reported two studies in which attempts have been made to identify a cloze percentage which corresponds to the instructional level. In his 1967 article, he reported using 73 fourth and fifth grade children to determine that multiple choice comprehension test scores of 75% and 90% corresponded with cloze scores of 38% and 50% when based on 275 word passages centered around literature, history, and science. In his 1968 study, in which he is reported to place greater confidence, he reported that 120 fourth, fifth, and sixth grade children obtained cloze scores of 44% and 57% to correspond with comprehension scores of 75% and 90% with passages taken from the Gray Oral Reading Tests. Bormuth again wrote his own questions.

In an attempt to replicate Bormuth's findings, Rankin and Culhane (7) studied the comprehension abilities of 105 fifth grade youngsters reading social studies and science articles. Their procedures differed somewhat from those used by Bormuth in that they constructed their multiple choice questions around a schema which consisted of seven types of questions, including inference questions, instead of the straightforward measurement of only those facts presented in the selection. In defense of his type of questions which are literal only, Bormuth states that his questions are lawful and therefore replicable because of their being ". . . transformations on the syntax of the sentences in the passage." (4, p. 190). Regardless of this inconsistency in the development of questions, however, the scores obtained in the Rankin and Culhane study were within the ranges of the two Bormuth studies. Corresponding

to a multiple choice comprehension score of 75% was a cloze score of 41% as compared with Bormuth's figures of 38 and 44%. The cloze score which corresponded with 90% multiple choice was 61%. This score is higher than either score (50% and 57%) reported by Bormuth. It is interesting to note that in both Bormuth's 1967 study and the Rankin and Culhane study the subjects took the cloze test over the same passage which they later read and answered questions. Table 1 presents the similarities of these findings.

Insert Table 1 about here

These studies present data which offers a frame of reference from which one can interpret cloze results when dealing with children in upper elementary school. Although the intent of the above studies was to present a data base from which generalizations could be drawn for all levels of readers, the age range sampled seems restrictive. It is the intent of the present authors to present an exploratory study to determine the feasibility of identifying a cloze percentage which would correspond to the Betts' definition of instructional level for comprehension for high school, trade school, and college students.

Procedure

Subjects Four different groups of subjects were used. The first group was 64 high school students, three classrooms of eleventh grade pupils from a suburban area of a northern industrial city. These students were enrolled in a general curriculum and were judged to be representative average ability students of the average high school for that city.

The second group was 28 high school students, eleventh graders enrolled in appliance repair in a regional vocational high school of the same northern city. The third group was 42 post-high school vocational-technical students enrolled in a medical technology training program in a multi-county southern vocational-technical school. The fourth group was 42 upper division university students who were enrolled in a reading methods course in a southern university. These students were majoring in elementary education, special education, and speech pathology.

Data Gathering Instruments

Two tests, one standardized and one cloze, on each subject served as the sources of data. The grade equivalent reading score of the subjects was obtained from the Nelson-Denny Reading Test or the Nelson Reading Test, comprehension subtest, depending on the estimated reading ability of the individual subject.

The second sources of data were cloze tests based upon seven selections from the area of health education which were approximately 275 words in length. The decision was made to predict the grade level placement of these health passages with the Dale-Chall Readability Formula (5) because the original validation studies had used Betts' criteria for comprehension on health education passages as the means for checking validity. That is, students reading with a given grade level equivalence were found able to answer correctly seventy-five percent or more of the questions asked on the health education passages which were predicted to be at their reading level.

The cloze passages were left with the first sentences intact and mutilated with an every 5th word deletion pattern. The deletions were

represented with a standard 15 space line. Answers were recorded directly in the cloze passages (i.e., no separate answer sheets were provided). Table 2 provides passage names and grade level predictions.

Insert Table 2 about here

Data Gathering and Analysis

The reading grade equivalent of each subject was obtained on a standardized test of reading comprehension; with most subjects, the Nelson-Denny Reading Test was used. Those subjects, however, whose reading grade equivalents were determined to be low enough to be in the extrapolated range (i.e., below 9th grade) were retested with the Nelson Reading Test in order to obtain a more nearly accurate grade equivalent score. Since there were no grade equivalent scores on the Nelson-Denny given which were higher than 14+ to match the passage which was identified by formula as being over 16 in difficulty, those subjects who scored higher than the 50th per centile for grade 16 were considered to have grade 16+ proficiency in reading.

Cloze passages were assigned to subjects on the basis of a match between grade equivalent scores on the reading comprehension tests and predictions of readability on the health education passages. Subjects were informed of the purpose of the experiment and were given as long as necessary to complete the cloze passage. Exact word replacements, with allowance for decipherable misspellings, were counted as correct.

All cloze testing occurred within 10 days of the standardized reading tests. Means, standard deviations, and standard error of the mean, were computed for the groups individually and as a whole.

Results and Discussion

The results for the four groups of subjects measured in this study are reported in Table 3.

Insert Table 3 about here

These results do not appear to be in agreement with those found by Bormuth or Rankin and Culhane as reported in Table 1. A further examination of the data seemed warranted.

An examination of mean cloze scores presented in Table 4 reveals an inconsistency among the groups of subjects measured. The mean scores for the general high school and vocational high school subjects were

Insert Table 4 about here

considerably greater than mean scores for the adult vocational-technical students and the university students. A discussion of possible causes for this discrepancy follows.

The mean scores of the two high school groups greatly exceeded the score for the instructional level found by Bormuth (3,4) and Rankin and Culhane (7) and in fact approached the independent level reported by these investigators, 57 and 61 percent respectively. This similarity to the independent level combined with the vast differences between the high school subjects and the adult subjects suggested a search for supporting data.

Table 5 reports the results from the comprehension subtest of the reading achievement tests. An examination of this table indicates that

Insert Table 5 about here

the adult vocational-technical subjects and the university subjects have mean reading scores at a level one would expect. The adult vocational technical subjects were in a medical technology program and judged by their teachers to be average high school graduates. The university subjects were beginning their third year in an elementary curriculum and while the mean score is not at grade level, it is not unusually low.

The mean reading scores for the two high school groups are lower then one would expect. The general high school group was drawn from a school judged as average for a midwestern urban area. A typical group of eleventh grade students from an average school would be expected by definition to have a mean grade level score of 11.00. A mean score of 7.33, however, does not appear to be an accurate measure of a typical group. The mean score for the vocational high school subjects was also low. While the vocational high school students may not typically be expected to read at grade level, a mean score of 4.86 did not seem right.

The inconsistency of reading achievement scores among the four groups of subjects seemed to warrant a further search for information. No additional information was available for the general high school subjects, the adult vocational-technical subjects, or the university subjects. However, the cumulative folders for a selected group of vocational high school subjects were available.

Accordingly, the cumulative folders for the eight vocational high school subjects receiving the lowest reading achievement scores were examined. Gates-MacGinitie Reading Tests scores from the fall of the school year indicated higher reading abilities than measured on the Nelson Reading Test. The mean grade level difference on the comprehension subtests was 2.86 years. While this information is from a small number of selected

subjects and may involve regression to the mean, it does seem to question the amount of confidence that can be placed in these Nelson Reading Test scores.

Additional investigation revealed that many of the high school subjects had received several standardized tests just prior to receiving the Nelson Rkading Test. It is possible these subjects were "tested out" and put forth a partial effort. If this was the case, one can only hypothesize that the cloze task intrigued the subjects and they put forth a maximum effort with a passage well below the instructional level. Thus, the result would be an unusually high score on the cloze task, approaching the independent levels as defined by Bormuth or Rankin and Culhane.

A second possible cause for the high school subjects' success could be their ability with the cloze procedure. If the reading grade levels reported in Table 5 are correct, then these subjects have likely been functioning in reading material written beyond their instructional level. Students continually faced with material in which they can identify relatively few words may develop advanced techniques in guessing words from the context of the passage. This guessing skill could transfer to a cloze task. Thus, these subjects might be paired with passages written at their instructional level but advanced skill in use of context clues enabled them to score unusually high on the cloze task.

The data from the high school subjects seems to raise more questions than it answers. Additional information seems necessary before any conclusions can be made.

The results from the adult vocational-technical subjects and the university subjects have been reported in Table 4. While these results

differ from those of the high school subjects, they are similar to those found by Bormuth (4) and Rankin and Culhane (6). The criteria determined by these researchers with elementary school children seem appropriate for use with adults.

Summary and Conclusions

The purpose of the present study was to determine whether or not the cloze percentage score which Bormuth has identified as corresponding to the instructional level for intermediate grade pupils is applicable to more sophisticated students. Accordingly, passages on health education, the readability of which had been determined with the Dale-Chall readability formula, were mutilated with an every 5th word deletion pattern and given to 176 high school and post-high school students on the basis of their measured reading abilities.

The results were not directly comparable with those obtained by Bormuth. The mean scores for the group as a whole were 50.50% as compared with Bormuth's finding of 44%.

The data were examined further because of this discrepancy. Mean scores for the high school and vocational high school were an almost identical 56.68% and 56.69% while those for the vocational-technical and university were similarly grouped at 43.05% and 44.41%. This unexpected range of scores and their subsequent grouping according to the age of the pupils remained unexplained. A sampling of the cumulative records, available only on the high school age students, for previous reading scores on other standardized tests yielded scores which were higher than those obtained in the study. It was hypothesized that the cloze material given these students may have been at a difficulty level

below their actual reading level. Directly related to this hypothesis is another, that the cloze scores of these groups would have approximated those of the post-high school groups had the reading levels been more nearly accurately obtained.

These hypotheses are, however, yet unproved, and the possibility exists that the scores were accurate and the data reflect a superior cloze ability on the part of the general and vocational high school students. Additional data is warranted before conclusion can be drawn.

No major discrepancies were observed or inferred with the adult groups. It does seem appropriate to conclude that it is possible to use Bormuth's criteria for determining the instructional level with adults.

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Table 1

Equivalent Cloze and Multiple-Choice Percentage Scores for Instructional and Independent Reading Levels

	Multiple-Choice Scores	Cloze Scores		
		Bormuth, 1967	Bormuth, 1968	Rankin and Culhane, 1969
Instructional Reading Level	75	38	44	41
Independent Reading Level	90	50	57	61

Table 2

Grade Level Readability Predictions of Health Education Passages

Topic	Dale-Chall Formula Prediction
Caring for Teeth	Below 4
The Four Groups of Food	5-6
The Middle Ear	7-8
Composition of Bone	9-10
Earache	11-12
Uses of Alcohol	13-15
Psychosomatic Disorders	Over 16

Table 3

Mean Percent of Correct Responses on Cloze Passages

Mean Cloze Score	Standard Deviation	Standard Error of Mean	N
50.50	13.55	1.02	176

Table 4

Mean Cloze Percentages by Educational Training of Subjects

Educational Training	Mean Cloze Score	Standard Deviation	Standard Error of Mean	N
General High School	56.69	11.67	1.46	64
Vocational High School	56.68	15.90	3.00	28
Adult Vocational-Technical	43.05	11.68	1.80	42
University	44.41	9.54	1.47	42

Table 5

Mean Reading Scores by Educational Training of Subjects

Subject	Mean Grade Level Score	Standard Deviation	Standard Error of means	N
General High School	7.33	1.26	.16	64
Vocational High School	4.86	1.67	.31	28
Adult Vocational-Technical	11.85	1.73	.27	42
University	14.31	1.68	.26	42